

6-6 Analyzing Graphs of Quadratic Functions

Vertex Form

$$y = a(x-h)^2 + k$$

Vertex (h, k)

a.o.s. $x = h$

Write the equation in vertex form.

ex

$$y = x^2 - 6x + 11$$

$$y - 11 = x^2 - 6x + 9$$

$$y - 2 = (x - 3)^2$$

$$y = (x - 3)^2 + 2$$

Graph it!

$$V(3, 2) \quad \text{a.o.s. } x = 3$$

h translates the graph horizontally

k translates the graph vertically

a controls the direction and opening

Write the equation in vertex form.

ex

$$y = 3x^2 + 2x$$

$$y = 3\left(x^2 + \frac{2}{3}x + \frac{1}{9}\right)$$

$$y = 3\left(x + \frac{1}{3}\right)^2 - \frac{1}{3}$$

$$V\left(-\frac{1}{3}, -\frac{1}{3}\right)$$

Write the equation in vertex form.

ex

$$y = -2x^2 + 20x - 35$$

$$\begin{aligned} y + 35 &= -2x^2 + 20x \\ y + 35 &= -2(x^2 - 10x + 25) \\ y - 15 &= -2(x - 5)^2 \\ y &= -2(x - 5)^2 + 15 \\ &\quad V(5, 15) \end{aligned}$$

Write the equation in vertex form.

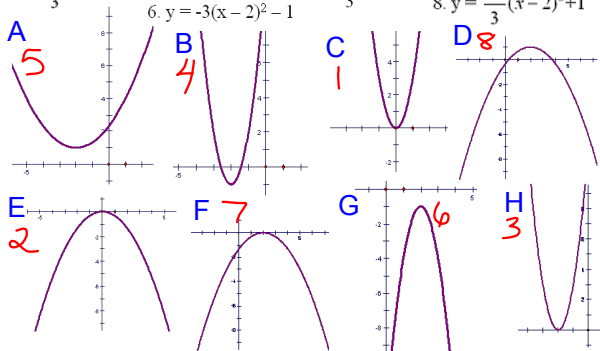
ex

$$y = 4x^2 + 2$$

$$\begin{aligned} y &= 4(x + 0)^2 + 2 \\ &\quad V(0, 2) \end{aligned}$$

Matching

1. $y = 3x^2$ 2. $y = \frac{-1}{3}x^2$ 3. $y = 3(x + 2)^2$ 4. $y = 3(x + 2)^2 - 1$
 5. $y = \frac{1}{3}(x + 2)^2 + 1$ 6. $y = -3(x - 2)^2 - 1$ 7. $y = \frac{-1}{3}(x - 2)^2$ 8. $y = \frac{-1}{3}(x - 2)^2 + 1$



HW
p326
15-31 odd